

R E P O R T

ON THE

SANITARY CONDITION

OF THE

MALTON URBAN SANITARY DISTRICT

FOR THE YEAR 1898,

BY

HENRY MAINWARING = HOLT,

M.R.C.S., L.S.A., D.P.H., &c.,

MEDICAL OFFICER OF HEALTH.

MALTON :

JONES & HONER, PRINTERS, " GAZETTE " OFFICE, WHEELGATE,

1899.

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THE SANITARY CONDITION
OF THE
MALTON URBAN SANITARY DISTRICT
DURING 1898.

REPORT OF THE MEDICAL OFFICER OF HEALTH
TO THE SANITARY COMMITTEE.

Area of the District.—The area of the District is 4,130 acres.

Population.—For the purposes of this Report an estimate is required of the number of persons living in the District at Midsummer, 1898. The estimate for 1898 is 4,684 persons.

Births and Deaths.—The returns of the local Registrar during the year 1898 recorded 129 births and 78 deaths. Of these 4 do not belong to the Malton Urban Sanitary District. The natural increase in the population of 1898 was, therefore, 55.

The following gives at a glance the numbers of Births and Deaths registered during the years 1891, 1892, 1893, 1894, 1895, 1896, 1897, 1898 :—

	1891	1892	1893	1894	1895	1896	1897	1898
Births	132	129	130	145	116	125	119	129
Deaths	105	68	102	56	94	83	75	74

Birth-rates.—There were 129 births registered during the year 1898, giving a birth-rate of 27.54 per thousand. In 1897 the birth-rate was 25.40 per thousand.

Death-rates.—The number of deaths registered during the year 1898 was 74, giving a death-rate of 15.79 per thousand. The infantile mortality for the same period being 169.35 per thousand births registered.

Inquests.—Four inquests have been held during the year. Of these two were upon cases of drowning, and call for some comment. For years I have advocated the provision of a suitable bathing-place where the youth of the town might safely acquire the art of swimming, but I regret to state that in spite of the loss of life which occurs yearly no such provision has been attempted. The apathy of those who might, and do not provide

such a boon, is a measure of their humanity. So far as the Council is concerned, it has done its best to obtain the required facilities.

Zymotic Diseases.—The deaths from zymotic diseases during the year number 10, viz.:—Whooping cough 2, diarrhoea 8. These deaths occurred in children under five years. In the absence of an epidemic, infantile diarrhoea is largely due to the improper feeding of infants; whooping cough, on the other hand, is due to causes with which we are as yet unable to cope; nevertheless, its spread may be hindered by careful isolation and disinfection.

The Zymotic Death-rate for the year 1898 is 2·13 per thousand, and in 1897, 1·06 per thousand. In 1896 the death-rate was 1·48 per thousand. In 1895 the death-rate was 3·57 per thousand.

Notification of Diseases.—The cases notified during the year appear in the subjoined tabular return, and also in the schedule which accompanies this report, in conformity with the requirements of the Local Government Board:—

Notifiable Diseases.	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
Scarlatina					1	3							1 5
Typhoid Fever					1	9	4						2 16
Continued Fever						5							5
Erysipelas					1			1					1 3
						3	17	4	1				4 29

The first typhoid case was probably imported, as also was certainly the first case of scarlet fever. It is worth remark that no cases were notified during the first four months of the year.

I have collected the zymotic death returns for the Malton Urban Sanitary District for the years 1891-1898 with the following results:—

DISEASE	1891	1892	1893	1894	1895	1896	1897	1898
Small-pox			3					
Measles			1					
Scarlatina					2			
Diphtheria.....				1	1	1		
Whooping cough..	3		3	1		3	1	2
Typhoid fever ...	4							
Typhus fever.....								
Diarrhoea	2	1	10		14	3	4	8
	9	2	16	2	17	7	5	10

It will be seen from the table that there has been no death from measles or typhus fever during the years 1891-1898. Deaths from typhoid fever disappear after 1891, as do deaths from small-pox after 1893, and scarlet fever after 1895. Diphtheria has not caused any death during 1897-8.

Influenza.—This disease was prevalent during the first two months of the year; a few cases extended into March. It is of interest to note that there is a well marked change in the clinical character of this disease. Contrasting the cases of 1891 with those of 1898, the former were marked by their extremely fatal character, nervous and muscular exhaustion were constant features, whilst few escaped lung complications of pneumonic type; in the latter period (1898) the cases pursued a milder course, and were of shorter duration, the chief clinical features resulting from various gastro-intestinal affections, whilst the previously mentioned conditions were present, but in modified form.

Scarlatina.—Five cases of Scarlatina have been notified to me during the year. One of these was imported from Hovingham. Inquiry showed that the patient did not know that she was suffering from the disease, but feeling ill she desired to return home, which she did, travelling some 12 miles by train. Cases of this kind are by no means infrequent, only a year ago Measles became a source of trouble, having been allowed to pass out of the Rural into the Urban District. The Council has decided to take action against future offenders.

Tuberculosis.—In my previous reports, annual and monthly, I have drawn your attention to this dread scourge, and have endeavoured to show that its ravages are more to be feared than those of Small-pox or Typhoid Fever, these kill more rapidly and produce greater panic amongst the people with a corresponding activity amongst sanitary administrators, but, inasmuch as we must be guided by thought rather than impulse, I will put down figures for your consideration. During the period 1891 to 1898 there has been no death from typhoid fever, and only 3 deaths from small-pox, but the various forms of tubercular disease have resulted in 58 deaths. Of these 4 do not belong to the Urban District.

What are the disease producing factors at work in a semi-rural population such as our own? I have little hesitation in referring you for answer to my annual report for 1895, and at the same time I may emphasise the opinion there expressed, that social condition, housing, and food supply are chief factors; the lower the social level, the nearer the hovel, and this, with its damp and filth, is far more deadly than tainted or questionable food.—That proper housing and ventilation are the chief factors in prevention, goes without saying, and the State which now smiles so approvingly upon the philanthropic endeavours of the wealthy in providing spacious

Sanatoria for the isolation of the consumptive, may soon officially recognise their importance, and then, Sanatoria, like workhouses, may become necessities. Sanitary Authorities can do much in the way of prevention by insisting upon the maxima of height, light, and space in all buildings, whether for human or animal habitation. It seems strange indeed that such elementary principles have not yet been grasped by the house builder, however, tubercular disease will still survive to show him the error of his ways. In this connection I must remind you that improved drainage of a district is followed by a lowering of the mortality from tubercular disease.

Diarrhoea.—This disease appeared as usual during the months of August, September, and October, and caused the death of six infants. These cases occurred in St. Leonard's Ward, and I am of opinion that a closer attention to the flushing of drains in this locality might do much to lessen the fatality from this disease.

SMALL-POX AND VACCINATION.

Having in view the peculiar state of public opinion with regard to vaccination and Smallpox, I take this opportunity of expressing myself upon the subject. My object is not to make converts but rather to produce thinkers. As illustrations of facts, the recent epidemics at Gloucester and Middlesbro' must speak for themselves.

GLoucester (1895-6).—A town in which infant vaccination had been neglected.

Total attacks, 1979. Deaths, 434. Fatality, 22·2

Age	VACCINATED (in infancy)			UNVACCINATED		
	Attacks	Deaths	Fatality per cent.	Attacks	Deaths	Fatality per cent.
Under 10	26*	1†	3·8	..	680	279 41·0
10-20	263	5	1·9	..	48	14 29·1
20-30	373	29	7·7	..	17	8 47·0
30 & over	549	85	15·4	..	23	13 56·5
Total	1211	120	Mean 9·9	..	768	314 Mean 40·9

*25 out of this 26 were over 5 years of age.

†This was a case of very doubtful vaccination. Of course, if it be eliminated, the fatality under 10 years becomes *nil*, as it was at Middlesbrough.

MIDDLESBROUGH (1898).—A town in which infant vaccination had been well maintained.

Total attacks, 1411. Total deaths, 202, Fatality, 14·2

Age	VACCINATED (in infancy).			UNVACCINATED.		
	Attacks	Deaths	Fatality per cent.	Attacks	Deaths	Fatality per cent.
Under 10	43	0	0	..	62	29 46·5
10-15	121	2	1·6	..	21	4 19·0
15-25	437	22	5·0	..	42	16 38·0
25 & over	612	84	13·5	..	73	45 61·6
Total	1213	108	Mean 8·9	..	198	94 Mean 47·4

FACTS TO BE NOTED.—1. General correspondence of the two epidemics in all respects except one, namely, the large proportion of attacks and deaths of unvaccinated children at Gloucester.

2. In both epidemics (*a*) Great difference in fatality, at all ages, between vaccinated and unvaccinated—most marked in childhood; (*b*) *Fatality* in “vaccinated” insignificant in early life; slight from 10 to 20 years, but increasing then and afterwards with age; *attacks* in childhood also few, but increasing with age; (*c*) No such difference in attacks or fatality amongst unvaccinated, both of them very high in childhood in the town in which infant vaccination had been neglected (Gloucester), and both also excessive even where there were few unvaccinated children to be attacked (Middlesbrough); (*d*) The great majority of the vaccinated having been well protected only in infancy, are over 20 years of age.

LESSONS.—(1) Good vaccination in infancy protects up to about 10 years of age with a high degree of probability against *attack* of smallpox, and almost with certainty against *death*.

(2) Even up to middle life it continues to give protection against *attack*, and still more so against *death*, though in a more rapidly decreasing degree.

(3) Re-vaccination, at about 10 years of age, is necessary in order to maintain a high degree of protection against accidental exposure to smallpox, and need not be repeated unless in the case of imminent danger from the actual neighbourhood of the disease.

(4) The protection given by efficient vaccination is comparable for a time with that given by an attack of smallpox, but not so lasting.

THE DANGER OF SMALLPOX.

Smallpox is one of the most infectious of all diseases. When unchecked, as it was up to the last century in all civilized countries, and as it still is among some savage races, it is one of the most devastating of all pestilences.

It is especially fatal to the young; even at the present day nearly half of the unvaccinated children attacked by it die (see statistics of Gloucester and Middlesbrough).

When it does not kill, it generally scars and sometimes blinds or maims. Pock-marked faces are very rare now; they used to be very common.

The infection of smallpox is so subtle and so readily spread, and the disease is, in some cases, so easily concealed, that no one can tell when he may be exposed to it and thus attacked unawares.

THE PREVENTION OF SMALLPOX.

There is only one effectual way of preventing smallpox and that is by vaccination.

The experience of a century, all over the world, confirmed by that of the two latest epidemics (Gloucester and Middlesbrough), proves that children under 10 years of age who are vaccinated properly in infancy are very rarely attacked by smallpox, and that if they are they scarcely ever die.

Even when persons so protected are attacked at a later age they mostly have the disease mildly, and death amongst them is uncommon under middle age.

This is confirmed by the experience of all epidemics, which shows that although the greater number of those attacked may have been vaccinated in infancy they were over 20 years of age, and had thus lost much of their original protection. But even then the deaths among them are much fewer than among the unvaccinated of the same age. Those who are re-vaccinated between the ages of 10 and 15 are very rarely attacked afterwards, and, if they should be, have the disease only in trifling form, being as effectually protected as they were during childhood when vaccinated in infancy, or as if they had then had small-pox.

THE SAFETY OF VACCINATION.

Untrue and exaggerated statements have been widely circulated as to the dangers of Vaccination. These statements have been carefully inquired into by the Royal Commissioners on Vaccination, appointed by her Majesty the Queen in 1889.

Their report is that these dangers, even in the case of human lymph, are "insignificant."

But, in order to remove even the slightest suspicion of taint of disease in the lymph, the Government have adopted the use of calf lymph, so prepared that no disease can possibly be communicated by it.

This lymph is used with perfect confidence by doctors in all parts of the world to vaccinate themselves and their children.

The troubles which occasionally follow vaccination in infancy (bad arms) can be avoided by care during and after the operation.

My own practice has been to vaccinate with pure calf lymph, and in no case has a "bad arm" resulted during the whole of the time I have been in practice amongst you—a period of over ten years.

The practical superintendence of a Smallpox Isolation Hospital has taught me to recognise the safety of the path experience has marked out.

Enteric Fever.—A slight outbreak of this disease, with its associate Continued Fever, occurred in your district during a part of the year, and gave rise to the following special reports:—

MALTON,

JULY 1ST., 1898.

Special Report upon an Outbreak of Typhoid Fever in the Malton Urban District.

TO THE MEMBERS OF THE MALTON URBAN DISTRICT COUNCIL.

GENTLEMEN,—

Owing to a marked increase in the number of cases notified to me as Enteric or Typhoid Fever since the meeting of the Sanitary Committee on Monday last, June 27th, I have deemed it advisable to call a Special Meeting for the purpose of placing certain evidence before you for your consideration. It will not be necessary for me to point out the extreme gravity of an epidemic of typhoid, since the Maidstone scourge will be fresh in your minds, the cost to that town has amounted to more than £1 per head of the population, estimated upon the same basis, the cost of a fever epidemic in your district would be from £4,000 to £5,000.

It will now be necessary for me to state that anterior to May 17th, 1898, no case of typhoid existed for that year, and I may state further that no case of death from typhoid appears in the death returns for 1892-3-4-5-6-7, or up to date of this report. This proves that conditions favourable to the generation of typhoid fever were non-existent in your district for the periods named.

We next have to consider when, where, and how the disease was introduced in the district.

The first case of typhoid fever was notified to me on May 17th, 1898, but no further case appeared until June 21st, a period of thirty-five days elapsing or intervening. Again on June 28th, six cases were notified, and one on June 24th and 29th respectively, making a total of ten cases of enteric fever. It is to be noted that several cases of continued fever have also been notified, and it may be that these are slight typhoid cases, and it is further to be observed that about 75 per cent. of the cases are in children.

Such is an epitome of the cases reported.

The next point for consideration is the probable origin of the cases. In every case the premises have been examined and the sanitary conditions found satisfactory. The milk supply has been inquired into, and found to have no connection with the outbreak; nor are the cases connected by school, or with previously existing cases. The only thing they have in common is the town's water supply, but, after carefully weighing the probabilities, I will hazard the opinion that the origin will not be found in your water supply.

Typhoid fever, in the majority of epidemics, is found to be water borne. Nevertheless, there are other modes of origin, one of the most prominent being foul emanations from sewers, and I should think this latter a very probable cause in your district.

It would serve no present useful purpose for me to enter into the detail of the many and various causes at work in the production of a Typhoid Epidemic. Let it be understood, therefore, that once a case of Typhoid occurs in a district it is practically impossible to keep infected matter out of the sewers. So that in due course the drainage system (in spite of flushing) becomes contaminated, and the poison grows and spreads; moreover, the

agencies at work in assisting are referable to temperature, rainfall, and atmospheric pressure. After a heavy rainfall, the sewers and drains on the lower levels are filled to their utmost capacity, the gas, thus dislodged, finds its way to the higher levels and outlets, and, if infected, thus gives rise to disease.

Enquiries have proved that the first case of disease was undoubtedly contracted outside the district, and that the subsequent cases have their origin in the district. The cause came into being during the first week in June and continued during the second week, with the result of the cases at present notified.

It would appear to me that the first step the Sanitary Authority should take is to make certain of the purity or otherwise of its water supply, and this would involve a complete analysis. The second step is to make a special examination of the sewers and drainage, and to apply such tests as will prove the efficiency of the sewers themselves, and their system of flushing.

In conclusion, I may state that the Council have given no power to the officers to have special examination made of various disease products, nor is there any material or place for the simplest investigation to be carried on. The usual practice in other towns and villages is to authorise the Medical Officer to use discretionary power in having analyses made. Such power is never abused, and it is the only weapon of use to either the Authority or its Officers. I shall have to make Special Reports to the Local Government Board and County Council.

I am,

Your Obedient Servant,

HENRY M. HOLT.

TOWN HALL, MALTON,

JULY 20TH, 1898.

A Second Report upon an Outbreak of Typhoid and Continued Fever in the Urban District of Malton, Yorkshire.

TO THE MEMBERS OF THE MALTON URBAN DISTRICT COUNCIL.

GENTLEMEN,

On July 1st inst I had to lay before you some hurried particulars of an outbreak of Typhoid Fever in your district, and such formed the subject of a Special Report, of which copies were sent to the Local Government Board and to the North Riding County Council.

The present report is supplementary to my previous report, and is intended to be of more detailed character.

Since your last meeting for the consideration of my previous report, I have carried out the suggestions contained therein and your resolution thereon.

The Water Supply from Well and Reservoir has been carefully analysed and found perfectly wholesome and free from contamination.

Using my discretion, I did not think it necessary to proceed with the analysis of the Samples of Sewage, but I did think it of importance to verify the nature of the disease by testing the blood of a typical case. Such test (Widal's) was made and found to be confirmatory. Clinical observation being, therefore, verified by scientific examination. Nevertheless there is

something more to say as to the type of the outbreak, and the number of cases notified to date hereof. In the majority of cases notified the patients were confined to bed for less than three weeks, some were not in bed three days, or even in bed at all, and with one exception all are now convalescent, thus the disease may be described as extremely mild in character, and the attacked as few in number, whilst the duration of the outbreak has been short. No cases have been notified to me since July 1st inst. The first case of the outbreak was notified on June 21st ult., and I hope the last on July 1st inst.

It is indeed strange that an outbreak of Typhoid should occur in your district, or indeed in any district, during May and June, a period of minimum intensity of such disease.

Typhoid, however, is intimately connected with temperature, rainfall, and the conditions arising therefrom

No typhoid, verified by scientific, as apart from clinical observation, had existed in your district since 1891. Conditions were not favourable to its existence, but unfortunately a case was introduced to the district and reported to me on May 17th. Such was isolated, visited and instructions given. On June 21st the first case of the present outbreak was notified, or thirty-five days from the introduced case being notified.

No connection is to be found between the cases that will allow of the evidence obtained being used legitimately. If, however, the rainfall and temperature for May and early June be considered in connection with the outbreak, it may be of value in our investigation. It cannot be doubted that the evacuations and washings from the first case entered the sewers in the early part of May, that from the 12th to the 19th May there was no rainfall, that on the 20th there fell 1.20 inches, or half of the rainfall of the month in a few hours. This would fill the sewers over full and cause backing up of water and gas to escape wherever vent might be found. The early part of June was cold, more like autumn than summer, and therefore more favourable to the existence of typhoid, but the latter part of June was unfavourable to the disease. I append short notes on the meteorology of the two months. Although I am most loath to believe in those spectral miasmas, yet I think that temperature, rainfall, and atmospheric pressure are productive of conditions which need no playful imagination to assist in the explanation of the important role they play in the spread of disease, especially of the character of typhoid.

Nothing is worse than panic, and in order that typhoid may not be prevalent in your district two points are to be noted : First, that your Water Supply is above suspicion ; and next, that your Sewers and Drains are properly constructed and periodically cleansed.

I have visited and verified the reports of your Sanitary Inspector in every case during the present outbreak.

Printed Copies of suggestions in cases of infectious disease have been given to each case, handbills and posters have been distributed calling upon occupiers to give every possible attention to their premises, and to notify to the Inspector of any nuisance. Sewers have been flushed three or four times a week and all done that thought or reason could suggest.

I have little hesitation in saying that the epidemic, if such it can be called, is at an end.

Yours obediently,

H. M. HOLT.

It is to be noted that the whole period of notification only extended over ten days, and that the outbreak was not attended with a single fatal case.

Water Supply.—There is no perceptible difference in the consumption of water. The tests have been taken at nights, between the hours of 11 p.m. and 7 a.m., and although the quantity per head has varied in different districts 50 to 100 per cent., the general average has been 36 gallons per head per day.

The average supply per head per annum has been 131,400 gallons.

The embankment between the smaller pool and the larger pool has been raised to 14 feet above the summer level of the river, so as to form a second line of defence against flood water.

The condition of the well, from which the town's supply is pumped, has been perfectly satisfactory, not the slightest discolouration having taken place. The pools have also been free from pollution, and the banks cutting off all connexion with the cut and river are in first-class condition.

During the past two months floods have been frequent in the river basins around that of the Rye and Derwent.

Nuisance Abatement.—This matter demands greater attention, nuisances are reported upon, orders to abate are served, but no further action is taken in many cases, so that they remain unabated from year to year. It will be seen from the schedule of nuisances in the appendix that a large number of cases have been reported of pigs kept in contravention of the bye-law made in behalf thereof. The Council has decided to deal with these cases on their merits, when reported as nuisances. During the past year I have visited every part of the district, and am pleased to state that some interest has been manifested in sanitary matters, many of the more serious cases have been abated, but much remains to be done, and I cannot too strongly recommend the Local Authority to enforce due compliance with its orders.

The schedules of nuisances investigated and dealt with during 1898, as required by the Local Government Board, will be found in the Appendix.

Ordinary Sanitary Operations.—The ordinary sanitary operations have received attention during the year. House to house inspections of cottage property have been made, gulleys, passage drains, &c., have been scoured and kept in order, and the systematic removal of ashpit refuse, at stated intervals, has been superintended. There are, however, scattered about the district many inefficient and antiquated gully-traps, and I must urge their inspection and removal. I am of opinion that there should be a more systematic flushing of house drains than obtains at present, if such a course were followed it would lead to the discovery of whatever imperfections in drainage existed and at the same time indicate the means of remedy. Foul emanations from drains are responsible for much sickness amongst adults, and whilst affecting the mortality of infants has

the two-fold result of increasing, at the same time, the zymotic and general death rates, to which I may refer you.

Bye-Laws.—Considerable care has been bestowed upon the drawing up of new Bye-Laws suitable to the district, and in consonance with present day sanitary requirements. The following is a list of the new Bye-Laws adopted by the Council and allowed by the Local Government Board:—Regulation of Offensive Trades; Slaughter Houses; Cleansing of Footways and Pavements; New Streets and Buildings; Common Lodging Houses; Prevention of Nuisances.

Disinfection.—During the year the Council entered into a combined scheme for the purchase of a “Thresh” portable disinfecter, the same having been purchased, is now at the disposal of the Combining Authorities.

Dairies, Cow Sheds, and Milk Shops Order, 1885.—Special care is taken that the ventilation, lighting, cleansing, drainage, and water supply on the premises used for the milk trade are thoroughly efficient. Such places, however, require constant inspection; moreover, the inspector should be required to obtain samples of milk from time to time for analysis. That milk supply and certain diseases are connected admit of no doubt, and I am strongly of opinion that infantile diarrhoea is markedly influenced by faulty drainage affecting the milk supply, and that both are most intimately connected under certain meteorological conditions.

(Signed)

HENRY MAINWARING-HOLT,

MEDICAL OFFICER OF HEALTH.

January, 1899.



APPENDIX.

SCHEDULE OF NUISANCES

FROM INSPECTOR'S JOURNAL FOR YEAR ENDED DEC. 31ST, 1898.

DETAILS OF NUISANCES REPORTED.

Description of Nuisance.	Number Reported	No. abated	Number Promised Abatement	No. in Abeyance.	Orders Deferred.	Total.
Asphalting (defective)	2			2		2
Ashpits (defective).....	2	2				2
Buildings, &c. (dangerous)	8	4	1	3		8
Drainage (defective)	4	1		3		4
Overcrowding	1	1				1
Piggeries (Insanitary)	2		1	1		2
Pigs kept within 60 feet of a Dwelling House	24			6	18	24
Totals	43	8	2	15	18	43

ROBT. RICHARDSON,

Surveyor and Sanitary Inspector.



(A). Table of Deaths during the year 1898 in the Malton Urban District, classified according to Diseases, Ages, and Localities.

(B). Table of Population, Births, and of new cases of Infectious Sickness, coming to the knowledge of the Medical Officer of Health, during the year 1898, in the Malton Urban District; classified according to Diseases, Ages, and Localities.

‘Notification of Infectious Disease’ is compulsory in the District since November, 1891.

METEOROLOGICAL RECORD, 1898.

RAINFALL.

	Total Depth. Inches.	Greatest fall in 24 hours. Depth.	Date.	No of Days on which o ^t or more fell.
January	0·80	0·25	3	10
February	1·65	0·45	26	13
March	1·76	0·30	15	11
April	2·53	0·96	11	12
May	2·45	1·20	20	11
June	1·94	0·42	1	15
July	0·82	0·15	28	12
August	3·20	0·60	3	13
September	0·34	0·20	17	7
October	3·15	0·95	16	17
November	2·52	0·65	20	16
December	1·60	0·45	27	17
	22·76			154

BAROMETRIC PRESSURE.

	Absolute Max. in.	Absolute Min. in.	Date.	Mean.	Total Range
January 14	30·80	29·15	10	30·13	1·63
February 4	·40	·20	22	29·87	1·25
March 8	·30	·55	29	·96	0·75
April 22	·40	·20	10	·86	1·20
May 18	·40	50	1	·61	0·90
June 19	·40	·85	22	·97	0·55
July 11	·40	·73	23	30·15	0·67
August 30	·35	·65	26	·06	0·70
September 1	·40	·95	28	·19	0·45
October 7	·50	·13	17	29·91	1·37
November 14	·20	28·80	25	·75	1·40
December 14	·60	·70	26	·82	1·80
	30·43	29·36		29·94	

TEMPERATURES.

	Mean Absl. Max.	Mean Absl. Min.	Mean Date	Mean Max.	Mean Min.	Daily Range	Total Range	Dew Point	Rel. 32 & Htg. blw	No. nights	
Jan. 7 ...	58°	11°	27°	47·7	31·6	39·6	41°	16·1	31°	38·2	90 ... 5
Feb. 1 ...	51°	21°	18°	46°	31·1	38·5	36°	14·9	33°	32·8	86 .. 13
Mar. 18 ..	57°	9°	22°	47·9	31·1	39·5	40°	16·8	35°	34°	80 ... 23
Apl. 8 ...	68°	5°	23°	52·2	36·3	44·7	46°	16·9	45°	39°	74 ... 8
May 14 ..	68°	26°	30°	57·9	39°	48·4	51°	18·9	38°	47·6	96 ... 3
June 19 ..	76°	22°	31°	63·7	44·7	54·2	57°	19°	45°	49·7	76 ... 2
July 15 ..	82°	20°	36°	70·4	46·7	58·5	59°	23·7	46°	50·2	68 ... —
Aug. 12 ..	83·9	9°	37°	71°	48·6	59·8	65°	22·4	86°	56·6	78 ... —
Sept. 8 ..	85°	21°	31°	71·2	44·4	57·8	61°	16·8	54°	52°	69 ... 3
Oct. 2 ...	75°	13°	29°	59·9	41·5	50·9	52°	18·9	46°	43·4	74 ... 3
Nov. 2 ..	69°	23°	22°	49·7	35·2	42·5	43°	14·5	38°	34·9	76 ... 9
Dec 3 ...	58°	31°	19°	50°	33·2	41·6	43°	16·8	39°	38°	84 ... 17
	63·4	27°	87°	38·5	48°	49·6	17·9		43°	78	86

Absolute Max.—85° September 16th. Absolute Min.—18° February 21st. Mean Monthly Max.—71·2 in September. Mean Monthly Min.—31·1 in February-March.

	Deg.	Deg.
Mean Temperature	-49.8	being 0.3 colder than 1897.
" Max. "	-57.2	" 1.0 warmer "
" Min. "	-39.5	" 1.3 col'cer "
Absolute Max. do	-85.	
	Min. do	-18.
Mean Daily Range	-16.9	
Total	-6.7	
Mean Due Point	-43.	
Mean Rel. Humidity	-78.	
Number of nights	32.	
	and below -86.	being 2 more than 1897
Mean cloud	-5.7	being 0.4 less "
Mean wind pressure	-3	approximating 17 miles.
Principal wind direction	-S W and W.	
Mean Temperature	above the average.	
Mean Min. "	-	"
Mean Max. "	-	"
Mean Due Point	-	"
Mean Rel. Humidity	-	"
Mean Cloud	—below	"
Mean Sunshine	—above	"
Mean wind pressure	—below	"